

fundamentally different from the teachings and claims of the present invention.

Beliveau's laser fan beams propagate along radial beam paths issuing from a common center or origin, as is stated, e.g., at col. 9, lns. 52-53. The time intervals between measuring the beams require knowledge of the revolution time T and a calculation of "circle percentages" as described in col. 10, lns. 56-67. Furthermore, the fact that fan beams intersect at the origin which is on the center axis of rotation (see col. 3, lns. 51-65) is shown in Figs. 2, 4, 7, 10-14. Beliveau further teaches that the fan beams should have different tilt angles Φ_1 , Φ_2 of their fan planes as measured from the vertical (see, e.g., Fig. 2a, 2b or 12 for details). The tilts of the fan beams are needed to determine an elevation angle (see, e.g., col. 9, lns. 45-57). To set these, the apparatus of Beliveau requires a complex calibration process at known elevation angle or azimuth. The azimuth needs to be very stable and is set with complicated leveling devices such as optical levels and others as described, e.g., col. 4, lns. 4-21; col. 4, lns. 46-67; col. 5, lns. 25-47.

In stark contrast, the beams as taught and claimed in the main claims of the present invention are not fan beams. In addition, they do not issue from the same origin or center of rotation, but are rotating such that the reference path

and the first path rotate about a center along a line of the reference path and not along a line of said first path, wherein, additionally, the line of the reference path and the line of the first path are non-parallel. Moreover, since present beams are not fan beams, they cannot propagate in planes that are tilted with respect to each other along the vertical. Therefore, determination of an elevation angle is not possible, and calibration of a stable azimuth does not apply. In fact, the teachings of Beliveau are repugnant to the operability of the present invention, because having an azimuthal variation in the beam path in the apparatus and method of invention would be impossible to implement without diverging beams (fan-shape) and would prevent the present invention from working to range a distance r to a feature if implemented.

Given the above, the applicants will now address the Examiner's specific rejections. Main claims **1, 18, 19** and **32** were rejected by the Examiner based on figure 1 (ref 10), figure 4 (ref 188), and figure 3 (ref 3). Based on the above, the present invention is novel because the teachings pointed out by the Examiner do not teach limitations of main claims, and in particular the limitation of:

... a rotation mechanism for rotating said reference path and said first path about a center along a line of said reference path and not along a line of said first path, wherein said line of said reference path and said line of said first path are non-parallel.

Regarding rejections over Beliveau to dependent claims **2** and **20**; **3** and **21**; **4** and **22**, **5**, **15** and **29**, **6**, **7**, the applicants submit that these claims are novel by virtue of being dependent from the main claims shown to be novel over Beliveau by the above arguments. In addition, with reference to the rejections of claims **2** and **20** it should be noted that Beliveau does not explicitly show non-collinear or folded paths in figure 1. Therefore all claims rejected under 35 U.S.C. 102 over Beliveau are submitted to be novel.

Moreover, because the fundamental differences pointed out above and the fact that Beliveau's teachings conflict with the working of the present invention, there is no suggestion or motivation for a person of average skill in the art to use Beliveau's teachings to derive subject matter as claimed. Therefore, claims **1-7**, **15**, **18-22**, **29** and **32** are submitted to be unobvious over Beliveau in compliance with 35 U.S.C. 103.

The Examiner has rejected claims **17**, **31** under 35 U.S.C. 102(b) as being clearly anticipated by Orman (US Pat. 5,767,960). The teachings of Orman address a different technique requiring three beams defining three planes and using at least three sensors whose positions with respect to each other are known. In fact, Orman teaches a 6D (6-

dimensional) system that finds all unknowns, i.e., position and orientation of an object including its pitch roll and azimuth, rather than just a linear distance r between it and the center of rotation, as taught and claimed by the applicants in claims **17, 31**. More precisely, these claims have limitations of beam paths rather than entire planes defined by "fan-shaped beams" (see, e.g., col. 10, lns. 26-36 of Orman). In addition, present claims contain the limitation of:

...rotating a reference path, said first path and said second path about a center along a line of said reference path and not along a line of said first path.

Claims **17, 31** are thus being submitted as novel over Orman in the sense of 35 U.S.C. 102.

In addition, there are fundamental differences between Orman's system and teachings about 6D location and pose determination with planes of light and at least three sensors at known location versus the beams of the present invention and unknown location of the feature to which distance r is being ranged. Based on these differences, there is no suggestion or motivation for a person of average skill in the art to use Orman's teachings to derive subject matter as claimed. Therefore, claims **17, 31** are submitted to be unobvious over Orman in compliance with 35 U.S.C. 103.

Obviousness Rejections under 35 U.S.C. §103

The Examiner has rejected claims **12, 14, 16, and 25** under 35 U.S.C. 103(a) as being unpatentable over Beliveau (US Pat. 6,545,751) in view of Orman (5,767,960).

Based on the arguments presented above, the main claims, on which claims **12, 14, 16, and 25** depend, have been shown to be independently novel in the sense of 35 U.S.C. 102 and unobvious in the sense of 35 U.S.C. 103 over both Beliveau and Orman. As neither of these references provides suggestions or motivations to combine their teachings and, in fact, these teachings can't be combined for technical reasons addressed above to derive the claimed subject matter, the applicants submit claims **12, 14, 16, and 25** to be unobvious over Beliveau in view of Orman.

The Examiner further rejected claims **7-11, 13, 23, 24 and 26** under 35 U.S.C. 103(a) as being unpatentable over Beliveau (US Pat. 6,545,751) in view of Korah (U.S. Pat. 6,115,111).

As to claims **7-11, 13, 23, 24 and 26** taken jointly, the applicants submit that because they depend from main claims shown to be novel and unobvious over Beliveau above, they are unobvious over Beliveau in the sense of 35 U.S.C. §103 by virtue of adding further limitations. Furthermore, even

if these claims were not unobvious over Beliveau by virtue of their dependency on claims unobvious over this reference, the applicants maintain that there is no motivation to combine Beliveau and Korah.

Conclusion

In view of the above arguments, the applicants submit all claims **1-32** have been placed in condition for allowance over the art of record.

Respectfully submitted,



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